

**LOSS COMPENSATED WAVELENGTH DIVISION MULTIPLEXING FILTER
MODULE**

James K. Eu

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Tong-Ning Li

C. Jacob Sun

ABSTRACT OF THE DISCLOSURE

A filter module that includes a filter, such as an AWG filter, and a semiconductor optical amplifier (SOA) is described. Additionally, a method of multiplexing and/or demultiplexing optical signals using the DWDM filter module is described. The filter and SOA can be integrated together either through compact packaging (with fiber and connectors), or through on-chip integration. The SOA can fully compensate for the insertion loss due to, for example, an AWG filter or plurality of AWG filters.

10 Additionally, the polarization dependent loss of the composite module can be reduced by adjusting the polarization dependent gain of the SOA to compensate for the polarization dependent loss of the AWG filter.

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